A plastic lens which comprises a plastic lens substrate obtainable by a process which comprises: mixing the following components (A) to (D): (A) a lens material monomer comprising diethylene glycol bisallylcarbonate or a monomer mixture comprising diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate, (B) an organic peroxide-based polymerization initiator, (C) a cobalt fluid comprising a cobalt compound represented by at least one of CoO-Al₂O₃ and Co-Al₂O₄ in a dispersant, and (D) at least one ultraviolet light absorbent selected from 2-hydroxy-4-octyloxybenzophenone, 2,2',4,4'-tetrahydroxy-4-octyloxybenzophenone and 2,2',4'-trihydroxy-4-octyloxybenzophenone; and casting the mixed fluid obtained by the mixing into a mold and polymerizing the fluid to obtain a plastic lens substrate are provided.
Field of the Invention

[0001] The present invention relates to a plastic lens exhibiting an excellent property for absorbing ultraviolet light and a process for producing the lens. More particularly, the present invention relates to a plastic lens which absorbs ultraviolet light having a wavelength of about 400 nm and suppresses coloring and a process for producing the lens.

Prior Art

[0002] Ultraviolet light is an electromagnetic wave having a wavelength in the range of about 200 to 400 nm and is considered to adversely affect the human health in various ways. It is increasingly desired for a spectacle lens that the lens absorbs ultraviolet light to protect the human eyes from ultraviolet light.


[0004] However, when a lens absorbing ultraviolet light having a wavelength up to about 400 nm is produced by using a conventionally used ultraviolet light absorbent such as 2,2'-dihydroxy-4-methoxy-benzophenone, 2,2'-dihydroxy-4-n-octoxybenzophenone and the like in accordance with the first process, a problem arises in that the prepared lens is markedly yellowed to cause poor appearance, in particular, when diethylene glycol bisallylcarbonate, which is the typical material for plastic spectacle lenses, is used.

[0005] As the second process for providing the ability to absorb ultraviolet light to a plastic spectacle lens, in accordance with the same process as that for tinting a plastic lens, the plastic lens is impregnated with an ultraviolet light absorbent by dipping the plastic lens into an aqueous fluid heated at 80 to 100°C in which the ultraviolet light absorbent is dispersed (for example, Japanese Patent Application Laid-Open No. 2001-91908). It is estimated that most of the commercial plastic spectacle lenses having the property of absorbing ultraviolet light having a wavelength up to 400 nm are produced in accordance with the second process.

[0006] However, in the preparation of a plastic lens having the property of absorbing ultraviolet light having a wavelength up to about 400 nm in accordance with the second process, it is necessary that the lens be dipped for a time as long as about 40 minutes when a sufficient ability to absorb ultraviolet light is provided to the plastic spectacle lens, and this causes a decrease in the productivity. To improve the productivity, it is proposed that an organic solvent is used in place of water which is conventionally used. However, there is the possibility that the plastic lens absorbing ultraviolet light having the wavelength up to about 400 nm produced in accordance with this process is more markedly yellowed.

[0007] In the third process for providing the ability to absorb ultraviolet light to a plastic spectacle lens, the surface of the plastic lens is coated with a substance absorbing and/or scattering ultraviolet light (for example, Japanese Patent Application Laid-Open No. Heisei 9(1997)-265059).

[0008] However, the third process has problems in that, when the layer absorbing ultraviolet light is formed, there are possibilities that the scratch resistance of the lens is insufficient and that the formed coating film of the layer tends to be cleaved.

Disclosure of the Invention

Problems to be overcome by the Invention

[0009] The present invention has been made to overcome the above problems. The present invention has the object of providing a plastic lens which absorbs ultraviolet light having a wavelength of about 400 nm and suppresses coloring and a process for producing the lens.

Means for overcoming the Problems

[0010] As the result of intensive studies by the present inventors to achieve the above object, it was found that the above object could be achieved by a combination of a specific ultraviolet light absorbent shown in the following as component (D) with other components (A) to (C), and the present invention was completed based on this knowledge.
The present invention provides a plastic lens which comprises a plastic lens substrate obtainable by a process which comprises:

mixing the following components (A) to (D):

(A) a lens material monomer comprising diethylene glycol bisallylcarbonate or a monomer mixture comprising diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate,
(B) an organic peroxide-based polymerization initiator,
(C) a cobalt fluid comprising a cobalt compound represented by at least one of CoO·Al₂O₃ and Co·Al₂O₄ in a dispersant, and
(D) at least one ultraviolet light absorbent selected from 2-hydroxy-4-octyloxybenzophenone, 2,2',4,4'-tetrahydroxy-4-octyloxybenzophenone and 2,2',4'-trihydroxy-4-octyloxybenzophenone; and

casting the mixed fluid obtained by the mixing into a mold and polymerizing the fluid to obtain a plastic lens substrate.

The present invention also provides a process for producing a plastic lens which comprises:

mixing following components (A) to (D):

(A) a lens material monomer comprising diethylene glycol bisallylcarbonate or a monomer mixture comprising diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate,
(B) an organic peroxide-based polymerization initiator,
(C) a cobalt fluid comprising a cobalt compound represented by at least one of CoO·Al₂O₃ and Co·Al₂O₄ in a dispersant, and
(D) at least one ultraviolet light absorbent selected from 2-hydroxy-4-octyloxybenzophenone, 2,2',4,4'-tetrahydroxy-4-octyloxybenzophenone and 2,2',4'-trihydroxy-4-octyloxybenzophenone; and

casting the mixed fluid obtained by the mixing into a mold and polymerizing the fluid to obtain a plastic lens substrate.

Effect of the Invention

In accordance with the process of the present invention, a plastic lens which absorbs ultraviolet light having a wavelength of about 400 nm and suppresses coloring can be obtained.

Preferable Modes for carrying out the Invention

The plastic lens of the present invention comprises a plastic lens substrate comprising following components A to D:

(A) a lens material monomer comprising diethylene glycol bisallylcarbonate as the essential component,
(B) an organic peroxide-based polymerization initiator,
(C) a cobalt compound represented by at least one of CoO·Al₂O₃ and Co·Al₂O₄, and
(D) at least one ultraviolet light absorbent selected from 2-hydroxy-4-octyloxybenzophenone, 2,2',4,4'-tetrahydroxy-4-octyloxybenzophenone and 2,2',4'-trihydroxy-4-octyloxybenzophenone.

Each component will be described in the following.

In the present invention, the lens material monomer comprising diethylene glycol bisallylcarbonate as the essential component means diethylene glycol bisallylcarbonate alone or a monomer mixture comprising diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate. The amount of diethylene glycol bisallylcarbonate in the lens material monomer (mixture) is more than 5 weight %.

Examples of the monomer copolymerizable with diethylene glycol bisallylcarbonate include aromatic vinyl monomers such as styrene, α-methylstyrene, vinyltoluene, chlorostyrene, chloromethylstyrene and divinylbenzene; mono(meth)acrylates such as methyl (meth)acrylate, n-butyl (meth)acrylate, n-hexyl (meth)acrylate, cyclohexyl (meth)acrylate, 2-ethylhexyl (meth)acrylate, methoxydiethylene glycol (meth)acrylate, methoxypolyethylene glycol (meth)acrylate, 3-chloro-2-hydroxypropyl (meth)acrylate, stearyl (meth)acrylate, lauryl (meth)-acrylate, phenyl (meth)acrylate, glycidyl (meth)acrylate and benzyl (meth)acrylate; mono(meth)acrylates having hydroxyl group such as 2-hydroxyethyl...
In the process of the present invention, a conventional dispersant such as a surfactant, an alcohol, a cellosolve, a hydrocarbon, a halogenated hydrocarbon and an ester can be used for dispersing component (C). It is preferable that at least one dispersant selected from alcohols, cellosolves and surfactants is used as the dispersant.

In the present invention, the cobalt compound represented by at least one of CoO·Al₂O₃ and Co·Al₂O₄, which is component (C), is a known compound disclosed in Japanese Patent Application Laid-Open Nos. Showa 54(1979)-41965, Showa 51(1976)-125487 and Heisei 01 (1989)-503809. Mixtures of diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate described in the specifications of these applications are included in the diethylene glycol bisallylcarbonate-based monomer in the present invention.

In accordance with the description in Japanese Patent Application Laid-Open No. Heisei 5(1993)-195445, in the present invention, it is preferable that component B has the function of bluing a lens. In the present invention, it is not particularly limited, and surfactants exhibiting excellent effect of dispersion are preferable. It is preferable that at least one dispersant selected from alcohols, cellosolves and surfactants is used as the dispersant.

In the present invention, the ultraviolet light absorbent of component (D) is at least one compound selected from 2-hydroxy-4-octoxybenzophenone, 2,2',4,4'-tetrahydroxy-4-octoxy-benzophenone and 2,2',4'-tri hydroxy-4-octoxybenzophenone. Among these compounds, 2,2',4,4'-tetrahydroxy-4-octoxybenzophenone is preferable. It is preferable that the amount of component (D) is in the range of 0.01 to 5.0% by weight based on the amount of the entire material of the plastic lens substrate described above.

In the present invention, the cobalt compound represented by at least one of CoO·Al₂O₃ and Co·Al₂O₄, which is component (C), is a known compound disclosed in Japanese Patent Application Laid-Open Nos. Showa 54(1979)-41965, Showa 51(1976)-125487 and Heisei 01 (1989)-503809. Mixtures of diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate described in the specifications of these applications are included in the diethylene glycol bisallylcarbonate-based monomer in the present invention.

In the present invention, it is preferable that the mixed fluid prepared above is degassed to remove the entire amount or a portion of the dispersant, and the degassed fluid is cast into a mold and polymerized to obtain the plastic.
The process for polymerizing the plastic lens monomer is not particularly limited. In general, the cast polymerization is used. The mixed fluid of components (A) to (D) described above is cast into a mold for forming a lens, and a plastic lens substrate is obtained by heating at a temperature in the range of -20 to 150°C.

To the mixed fluid of components (A) to (D) described above, for example, polymerization catalysts such as those described in Japanese Patent Application Laid-Open Nos. Heisei 07(1995)-063902, Heisei 07(1995)-104101, Heisei 09(1997)-208621 and Heisei 09(1997)-255781, internal mold releases such as those described in Japanese Patent Application Laid-Open Nos. Heisei 01(1989)-163012 and Heisei 03(1991)-281312, antioxidants and other auxiliary agents can be added, where necessary. Where necessary, red pigments can be added. Examples of the red pigment include quinacridone-based pigments such as quinacridone magenta of the CI number 73915 (pigment red 122), quinacridone pigment of the CI number 73900 (pigment red 19) and quinacridone E of the CI number 73905 (pigment red 209).

The plastic lens obtained in accordance with the present invention can be tinted with a tinting agent. A hard coat film may be formed on the plastic lens using a coating fluid containing an organic silicon compound or fine particles of an inorganic substance such as tin oxide, silicon oxide, zirconium oxide and titanium oxide to improve resistance to scratches. A primer layer containing a polyurethane as the main component may be formed to improve impact resistance. An antireflection film may be formed using silicon oxide, titanium dioxide, zirconium oxide or tantalum oxide to provide the antireflection property. A water-repelling film may be formed on the antireflection film using an organosilicon compound having fluorine atom to improve the water-repelling property.

The plastic lens prepared as described above suppresses coloring even though the lens absorbs ultraviolet light having a wavelength of about 400 nm and can be advantageously used as the plastic lens for spectacles.

The present invention will be specifically described in the following with reference to examples. However, the present invention is not limited to the examples. The properties of the plastic lenses obtained in Examples and Comparative Examples were obtained in accordance with the following methods.

1. YI value: The YI value was obtained in accordance with the method for obtaining the yellow degree of plastics and the method for testing the yellowing of plastics described in Japanese Industrial Standard K7103-1977.
2. Transmittance of ultraviolet light: The transmittance at the wavelength of 385 nm was measured by using a spectrophotometer (U3410, manufactured by HITACHI SEISAKUSHO Co., Ltd.).
3. Luminous transmittance: The luminous transmittance was calculated using U3410.
4. Appearance: The appearance of a lens was evaluated by visual observation.

Example 1

(a) Preparation of a bluing master fluid

A mixed fluid prepared by dispersing a complex compound of cobalt oxide and aluminum oxide (CoO Al₂O₃; the particle diameter: 40 to 50 nm; manufactured by CI KASEI Co., Ltd.) in an amount of 3% by weight in a mixed dispersant of n-butanol and methyl cellosolve (n-butanol:methyl cellosolve=2:1, as the ratio of the amounts by mole), was used. The prepared mixed fluid was mixed with diethylene glycol bisallylcarbonate monomer (CR-39) in a manner such that the amount of the mixed fluid was 20% by weight and the amount of CR-39 was 80% by weight, and a bluing master fluid was prepared.

(b) Preparation of a plastic lens

To 100 parts by weight of diethylene glycol bisallylcarbonate, 3 parts by weight of diisopropyl peroxydicarbonate as the organic peroxide-based polymerization initiator, 1 part by weight of 2-hydroxy-4-octyloxybenzophenone as the ultraviolet light absorbent and 0.6 parts by weight of the bluing master fluid prepared above in (a) was added. After the obtained mixture was sufficiently mixed under stirring, the mixture was cast into a mold for forming a lens composed of glass molds and a gasket made of a resin (0.00D; the diameter of the lens: 70 mm; the thickness of the lens: set at 2.2 mm). The polymerization was conducted by slowly elevating the temperature from 40°C to 90°C over 20 hours in an electric oven, followed by keeping the temperature at 90°C for 1 hour. After the polymerization was completed, the gasket and the glass molds were disassembled, and a lens was obtained after the heat treatment at 120°C for 2 hours. The obtained plastic lens had a YI value of 0.74 and a transmittance of ultraviolet light having a wavelength of 385 nm of 1.82% at the central portion (the thickness: 2.2 mm). Thus, the lens exhibited the excellent property for absorbing light.
ultraviolet light. The appearance was colorless and transparent. No uneven color tone due to the bluing master fluid was found. The luminous transmittance was 90.59%.

Example 2

A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.04 parts by weight of 2,2',4,4'-tetrahydroxy-4-octyloxybenzophenone was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 0.4 parts by weight of the bluing master fluid was used. The obtained plastic lens had a YI value of 0.81 and a transmittance of ultraviolet light having a wavelength of 385 nm of 1.99% at the central portion (the thickness: 2.2 mm). Thus, the lens exhibited the excellent property for absorbing ultraviolet light. No uneven color tone due to the bluing master fluid was found. The luminous transmittance was 91.14%. The results are shown in Table 1.

Example 3

A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.04 parts by weight of 2,2',4'-trihydroxy-4-octyloxybenzophenone was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 0.3 parts by weight of the bluing master fluid was used. The obtained plastic lens had a YI value of 0.80 and a transmittance of ultraviolet light having a wavelength of 385 nm of 1.91% at the central portion (the thickness: 2.2 mm). Thus, the lens exhibited the excellent property for absorbing ultraviolet light. No uneven color tone due to the bluing master fluid was found. The luminous transmittance was 91.10%. The results are shown in Table 1.

Comparative Example 1

A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.8 parts by weight of 2,4-dihydroxybenzophenone was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 0.8 parts by weight of the bluing master fluid was used. Although the obtained plastic lens had a transmittance of ultraviolet light having a wavelength of 385 nm of 1.65% at the central portion (the thickness: 2.2 mm), the YI value was 1.90, and the lens was colored yellow. The luminous transmittance was 90.35%. The results are shown in Table 1.

Comparative Example 2

A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.3 parts by weight of 2,4-dihydroxybenzophenone was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxybenzophenone and 0.8 parts by weight of the bluing master fluid was used. Although the obtained plastic lens had a YI value of 0.78 at the central portion (the thickness: 2.2 mm), the transmittance of ultraviolet light having a wavelength of 385 nm was 9.45%, and the lens exhibited a poor property of absorbing ultraviolet light. The luminous transmittance was 90.35%. The results are shown in Table 1.

Comparative Example 3

A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.8 parts by weight of 2,4-dihydroxybenzophenone was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxybenzophenone and 2.4 parts by weight of the bluing master fluid was used. Although the obtained plastic lens had a YI value of 0.79 and a transmittance of ultraviolet light having a wavelength of 385 nm of 1.65% at the central portion (the thickness: 2.2 mm), cloudiness was found on the lens, and the luminous transmittance was 88.40%, which was smaller than those in Examples 1 to 3. The results are shown in Table 1.

Comparative Example 4

A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.25 parts by weight of 2-(5-methyl-2-hydroxyphenyl)benzotriazole was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 1.0 part by weight of the bluing master fluid was used. Although the obtained plastic lens had a transmittance of ultraviolet light having a wavelength of 385 nm of 1.22% at the central portion (the thickness: 2.2 mm), the YI value was 2.15, and the lens was colored yellow. The luminous
transmittance was 90.13%. The results are shown in Table 1.

Comparative Example 5

[0046] A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.15 parts by weight of 2-(5-methyl-2-hydroxyphenyl)benzotriazole was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 1.0 part by weight of the bluing master fluid was used. Although the obtained plastic lens had a YI value of 0.75 at the central portion (the thickness: 2.2 mm), the transmittance of ultraviolet light having a wavelength of 385 nm was 9.30%, and the lens exhibited a poor property of absorbing ultraviolet light. The luminous transmittance was 90.24%. The results are shown in Table 1.

Comparative Example 6

[0047] A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.25 parts by weight of 2-(5-methyl-2-hydroxyphenyl)benzotriazole was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 2.75 parts by weight of the bluing master fluid was used. Although the obtained plastic lens had a YI value of 0.75 and a transmittance of ultraviolet light having a wavelength of 385 nm of 1.22% at the central portion (the thickness: 2.2 mm), cloudiness was found on the lens, and the luminous transmittance was 88.74%, which was smaller than those in Examples 1 to 3. The results are shown in Table 1.

Comparative Example 7

[0048] A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.07 parts by weight of 5-chloro-2-(2,4-dihydroxyphenyl)benzotriazole was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 1.0 part by weight of the bluing master fluid was used. Although the obtained plastic lens had a transmittance of ultraviolet light having a wavelength of 385 nm of 1.48% at the central portion (the thickness: 2.2 mm), the YI value was 2.02, and the lens was colored yellow. The luminous transmittance was 90.21%. The results are shown in Table 1.

Comparative Example 8

[0049] A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.35 parts by weight of 5-chloro-2-(2,4-dihydroxyphenyl)benzotriazole was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 1.0 part by weight of the bluing master fluid was used. Although the obtained plastic lens had a YI value of 0.81 at the central portion (the thickness: 2.2 mm), the transmittance of ultraviolet light having a wavelength of 385 nm was 10.10%, and the lens exhibited a poor property of absorbing ultraviolet light. The luminous transmittance was 90.24%. The results are shown in Table 1.

Comparative Example 9

[0050] A plastic lens was obtained in accordance with the same procedures as those conducted in Example 1 except that 0.07 parts by weight of 5-chloro-2-(2,4-dihydroxyphenyl)benzotriazole was used as the ultraviolet light absorbent in place of 1 part by weight of 2-hydroxy-4-octyloxy-benzophenone and 2.75 parts by weight of the bluing master fluid was used. Although the obtained plastic lens had a YI value of 0.80 and a transmittance of ultraviolet light having a wavelength of 385 nm of 1.48% at the central portion (the thickness: 2.2 mm), cloudiness was found on the lens, and the luminous transmittance was 88.56%, which was smaller than those in Examples 1 to 3. The results are shown in Table 1.

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INDUSTRIAL APPLICABILITY

[0051] In accordance with the process of the present invention, a plastic lens which absorbs ultraviolet light having wavelength of about 400 nm and suppresses coloring can be obtained. The obtained lens is advantageously used as a plastic lens for spectacles.

Claims

1. A plastic lens which comprises a plastic lens substrate obtainable by a process which comprises:

   mixing the following components (A) to (D):

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sb102: 2-Hydroxy-4-octyloxybenzophenone
sb106: 2,2’,4,4’-Tetrahydroxy-4-octyloxybenzophenone
sb1060: 2,2’,4’-Trihydroxy-4-octyloxybenzophenone
sb100: 2,4-Dihydroxybenzophenone
sb701: 2-(5-Methyl-2-hydroxyphenyl)benzotriazole
sb7012: 5-Chloro-2-(2,4-dihydroxyphenyl)benzotriazole
(A) a lens material monomer comprising diethylene glycol bisallylcarbonate or a monomer mixture comprising diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate,
(B) an organic peroxide-based polymerization initiator,
(C) a cobalt fluid comprising a cobalt compound represented by at least one of CoO·Al₂O₃ and Co·Al₂O₄ in a dispersant, and
(D) at least one ultraviolet light absorbent selected from 2-hydroxy-4-octyloxybenzophenone, 2,2',4,4'-tetrahydroxy-4-octyloxybenzophenone and 2,2',4'-trihydroxy-4-octyloxybenzophenone; and

casting the mixed fluid obtained by the mixing into a mold and polymerizing the fluid to obtain a plastic lens substrate.

2. A plastic lens according to Claim 1, wherein the organic peroxide-based polymerization initiator of component (B) is at least one compound selected from benzoyl peroxide, diisopropyl peroxycarbonate and t-butyl peroxy-2-ethylhexanoate.

3. A plastic lens according to any one of Claims 1 and 2, wherein the particle diameter of the cobalt compound of component (C) is 10 to 1,000 nm.

4. A plastic lens according to any one of Claims 1 to 3, wherein the plastic lens substrate has a YI value (a degree of yellowness) of 0.4 to 1.5 and a transmittance of ultraviolet light having a wavelength of 385 nm of 5.0% or smaller at a central portion when the central portion has a thickness of 2.2 mm.

5. A plastic lens according to any one of Claims 1 to 4, which is a plastic lens for spectacles.

6. A process for producing a plastic lens which comprises:

mixing following components (A) to (D):

(A) a lens material monomer comprising diethylene glycol bisallylcarbonate or a monomer mixture comprising diethylene glycol bisallylcarbonate and monomers copolymerizable with diethylene glycol bisallylcarbonate,
(B) an organic peroxide-based polymerization initiator,
(C) a cobalt fluid comprising a cobalt compound represented by at least one of CoO·Al₂O₃ and Co·Al₂O₄ in a dispersant, and
(D) at least one ultraviolet light absorbent selected from 2-hydroxy-4-octyloxybenzophenone, 2,2',4,4'-tetrahydroxy-4-octyloxybenzophenone and 2,2',4'-trihydroxy-4-octyloxybenzophenone; and

casting the mixed fluid obtained by the mixing into a mold and polymerizing the fluid to obtain a plastic lens substrate.

7. A process for producing a plastic lens according to Claim 6, which comprises degassing the mixed fluid to remove the entire amount or a portion of the dispersant, casting the fluid obtained by the degassing into a mold and polymerizing the fluid to obtain a plastic lens substrate.

8. A process for producing a plastic lens according to any one of Claims 6 and 7, wherein the organic peroxide-based polymerization initiator of component (B) is at least one compound selected from benzoyl peroxide, diisopropyl peroxycarbonate and t-butyl peroxy-2-ethyl-hexanoate.

9. A process for producing a plastic lens according to any one of Claims 6 to 8, wherein the particle diameter of the cobalt compound of component (C) is 10 to 1,000 nm.

10. A process for producing a plastic lens according to any one of Claims 6 to 9, wherein the dispersant comprises at least one dispersant selected from alcohols, cellosolves and surfactants.

11. A process for producing a plastic lens according to any one of Claims 6 to 10, wherein the dispersant is a mixed fluid comprising methyl cellosolve, butanol and a surfactant.
12. A process for producing a plastic lens according to any one of Claims 6 to 11, wherein the particle diameter of the cobalt compound of component (C) is 10 to 1,000 nm.

13. A process for producing a plastic lens according to any one of Claims 6 to 12, wherein the plastic lens is a plastic lens for spectacles.
# EUROPEAN SEARCH REPORT

**EP 1 521 102 A1**

## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>CLASSIFICATION OF THE APPLICATION (Int.Cl.)</th>
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<tr>
<td>Y</td>
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## TECHNICAL FIELDS SEARCHED (Int.Cl.)

- G02B
- C08F

The present search report has been drawn up for all claims.

**Place of search**

Munich

**Date of completion of the search**

1 February 2005

**Examiner**

Andriollo, G

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**CATEGORY OF CITED DOCUMENTS**

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<td>JP 60245607 A</td>
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For more details about this annex: see Official Journal of the European Patent Office, No. 12/82.